MRP Can Be Better The Second Time Around, But . . .

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MRP CAN BE BETTER THE SECOND TIME AROUND, BUT . . .

Why not do it right the first time? But how?

The idea for this presentation occurred at the San Diego conference when a conversation 7ass overheard that went like this. One attendee said that what he'd like to hear at a conference is someone who would tell of the real difficulties they experienced in implementation of MRP . . . the mistakes that were committed . . . the chllenges they faced. His partner responded, he'd like to know of a step-by-step guide to making it happen. It seemed they were both discouraged by the implementation challenges that MRP presented. They were from smaller companies, without in-house computers and the attendant EDP staffs.

Upon hearing that, I mused over how familiar it seemed, and how often that same plea had reached my ears. Just exactly what is involved? And how does one go about it? Later I learned of a detailed implementation plan developed by a consultant for use by a computer service firm in helping their customers with implementation. I heard of additional difficulties faced by other firms who were not achieving the full benefits from their efforts, for one reason or another.

I thought of the firms who claimed they were doing MRP, but in fact were only paying for the package. I thought of my own experiences, as an engineer, Manufacturing Systems practitioner and consultant, and how much can be learned from failure analysis and sharing of experiences. My feeling is that we can learn from each other, and that is why we are here. We hope our experiences will prove helpful to others.

BACKGROUND

Up-Right is a manufacturer of aluminum scaffolds and self-propelled work platforms. Our world-wide sales are in the $20 million range, with three plants in the U.S.A., and one each in Canada, France and Ireland. At present, our MRP efforts are limited to the two U.S. plants of the scaffold division, which produce over $10 million annually.

Our sales have doubled in the last four years and our product line has become increasingly complex. Our scaffold line has many common parts, simple bills of material, and a short manufacturing lead time once materials are available. In contrast, the self-propelled work platforms are much more complex, amounting to battery-powered, hydraulically actuated, electronically controlled lift trucks. There are ten times as many parts, and lead times of four months.

Ours is a marketing-oriented firm selling direct to the customer. Our strength in the marketplace is based on our ability to respond quickly to our customer's needs, with products of highest quality, custom designed when necessary. We are an extraordinarily successful firm by all criteria. My comments should be interpreted only in the light that we seek constant improvement regardless of how well we are doing.

We had entered the computer age with an entry-level computer and software that was more oriented toward accounting applications than manufacturing. The "Requirements Planning" software was little more than an order point inventory package enhanced with a bill processor and a time-phased order point feature. The computer manufacturer was unable to show us an installation where there was working software, in a firm of our size. It must be said that the same was true of the other manufacturers at that time.

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Our corporate needs for manufacturing planning and control became more apparent as our inventories tripled during a mere doubling of sales. Coupled with the collapse of the capital market for funds, and the inflation-caused inventory profits, we were in dire need of reductions in inventories. It was at this time that we decided to wait no longer for release of a real MRP package and went to a service that had a package that was ready to go. Our first run indicated that 50 percent of the items on hand would not be needed for the next six months! Armed with the facts about the time-phasing of the net requirements, we were able to reduce inventory by over one-third in the next eight months.

But, was our switch from in-house the answer? Not completely. It did give us the facts with which to reduce inventory and because we had loaded labor as a dummy part in each of our bills of material, we obtained a first-cut capacity load that indicated an excess of labor in one plant.

Interestingly, MRP is characterized as a tool predicting shortages. In our case the first benefit was predicting surpluses of both labor and materials which took months to be accepted by some.

But we had not prepared properly. We had not laid the foundations for inventory record accuracy. We were not master scheduling in the real sense. We thought our bills of material were clean, when in fact they were not. Our people, at all levels, did not understand what had to be done to make a manufacturing planning and control system, anchored by MRP, a working reality.

After the initial flush of success, we were still plagued by questions from users such as: "Why do we have to count the same parts every few weeks?", "Why do we have to change these bills of material?", "Doesn't the computer have all these numbers?", "... MRP is in control . . .", "The computer made a mistake".

We had overlooked the people part of the program.

This was confirmed by a consultant whom we asked to review our efforts and make recommendations. He pointed out that we were realizing only a small fraction of the potential benefits. From his "outsider" point of view, he was effective in pointing out to our management that MRP is a different way of running a business. It affects more than just the people in P&IC. He stated that we would be unable to make the system work without an educational program of the type described in the detailed implementation plan to follow. He found that users felt uncomfortable with the system and lacked understanding of how it works. "The need for education is just as great at the top management level as at the user level", he emphasized. More importantly, he pointed out that there was something lacking - that of real commitment to MRP by management. What was needed was more than just approval, but commitment, implying an active and vigorous management effort.

We decided to make a fresh start and followed the detailed implementation plan formulated by him, laid out in step-by-step fashion.

THE IMPLEMENTATION PLAN

This plan is probably not new to everyone. It certainly seems familiar to those of us who read the literature, or who have seen the IBM films or the video-tapes. What is new is that it is down in black and white and interpreted. It is this implementation plan that I felt was worthy of building our presentation about and sharing with you. This plan is being expanded ten-fold in detail in order to make it more useful. It is reproduced in the appendix in the draft form in which it has appeared over the last year. Where appropriate, I will comment briefly on our experiences with the plan and where emphasis should be placed, in our opinion.

1. First Cut Education

I feel first-cut education should begin at the top management and explain thoroughly "What is MRP?" "How does it work?" "Why should we as a company commit to it?"

The best way to accomplish this is by attending one of the top management seminars conducted by the leading consultants. Several of the computer manufacturers have executive over-view films or video series. In my opinion, they lack the opportunity to rub elbows and share experiences with others that is afforded by management people from various companies and industries learning together, away from the plant. Since MRP is a new way to run a company, I feel it is vital that top management have the thorough understanding of the concept of "closed loop" systems. They must understand sufficient of the vocabulary to avoid semantic difficulties. They must learn enough to be able to ask proper questions at the proper times. They must learn enough to understand fully what is needed in order to justify MRP and make the management commitment.

I would be remiss if I failed to point out that the key person selling, justifying and implementing MRP has a duty to master the general principles early in the game. Someone has to be able to carry the ball as the plan is developed. It behooves any P&IC practitioner to prepare himself thoroughly if he desires to sell management, or is being "sold" by them.

2. Justification, Commitment, And Assignment of Responsibility

Justification is something that will vary with the individual and the firm. If a program is being sold from the top down, perhaps none is needed once the top manager has decided "it shall be". On the other hand, if you're trying to sell MRP from the bottom up, I suggest you sit in on the presentation at this conference which is completely devoted to a method of system justification based on a benefits-to-cost analysis.

An effective technique we used was to look at what parts were being ordered by purchasing and made in the shop, and determine when they were really needed. It was very enlightening to discover how order-point techniques tend to replace inventory from the bottom up, without considering the real time-phased net requirement.

Once again, it is very important that management understand that the differences in results are a function of the approaches used, and that MRP can demonstrate its superiority by simulation if desired.

Commitment is a top management responsibility and the managerial effort to accomplish that commitment must be expended. As the consultant stated, "Commitment is something that involves more than just tacit approval. Top management must be fully involved because of the interaction of MRP on each of the three functional segments of the business". For example, a production plan, derived from the forecast and the input to the master schedule, requires trade-offs to meet the conflicting objectives of Marketing, Manufacturing, and Finance. Because of these trade-offs, the master schedule input to MRP requires thorough understanding by management, and a firm commitment to maintaining the master schedule feasibility.

The implementation team should come from as wide a spectrum of the users and functional divisions as is feasible. I would agree that the team leader be fulltime. Once again, this is a measure of the degree of commitment. He certainly must be a user, rather than a data processing or systems man. He must be a leader and have enough clout to make things happen.

Periodic management review has dual benefits, not only to keep the project moving, but to acquaint management with what is being accomplished. It is vitally important to keep information flowing, both upward and downward. There's no better

opportunity to sell progress and acquaint management with problems than at these review meetings when a forum is available to discuss areas of conflict.

The management review affords excellent opportunity for selling the various benefits of a program. In addition, education can be carried out on a continuous basis, as it is determined that there is need for clarification of objectives, reponsibilities, accountability, etc. All MRP'rs are urged to read Dick Bourke's "Methods to Move the Management Mountains" in the 1975 proceedings, in which he outlines the salesmanship necessary to retain the degree of commitment necessary to complete a job.

3. Detailed Education Plan. As the comments indicate, this phase of the plan is aimed at the people part of the system. It is vital that they understand what MRP is and is not, and be able to translate the general principles of MRP into the specifics of MRP at the company. There is a wide range of opinion about the importance of this step. My own experience is that it is probably the most important. Not only must there be education sufficient to permit intelligent participation, but sufficient in detail and depth to permit proper implementation.

Outside courses appear to be most effective for those who will become teachers at later in-house teaching sessions. I feel that it is vital that contacts be established with others who are implementing in order to learn of the problems and satisfactions. Bringing in a consultant to your firm does not afford this advantage, but is a most effective way to handle large groups. For the long-term training and re-training, an in-house tool such as the MRP video course, or the programmed-learning self-teaching courses available through IBM, are powerful and effective tools. A commitment should be made to one or the other so that it can be used and re-used as needs change and people come and go.

It's vital that the department heads and supervisors demonstrate thorough understanding themselves, in order that they can become the teachers of the users who work for them. This sometimes presents a problem because not everyone enjoys teaching. This is a vital point, however, and should be practiced to the greatest extent. If there is a supervisor who is reticent about undertaking this responsibility, and another instructor assumes that responsibility, all teaching should be done in the presence of both supervisor and his subordinates.

The extent to which management commits itself to education and its inherent cost may provide the first quantitative measure of the degree of their commitment. Education is one of the largest of the initial expenses in undertaking this type of systems improvement. Consultation with successful firms of comparable size could disclose the magnitude of their investment.

You will note that education begins soon after the decision to implement is made. I would like to emphasize that the need for education and training should be continuously monitored as implementation progresses. Many times, action to be taken follows too long after the initial exposure, and details may be forgotten.

4. Inventory Record Accuracy

Much has been said about the necessity for inventory record accuracy since George Plossl and others wrote their seminal articles on this subject. As I write this presentation, an article appears in "Industry Week" magazine quoting Darryl Landvater who says, "Even trivial errors can wreck an inventory system". Darryl's quotation urges that companies shoot for 95% accuracy in their inventory status records. The importance of that goal must be understood by the users in order that they exercise the discipline that is required to achieve it. Once again, education is extraordinarily important since it is the factory people who feed back most of the information that affects on-hand status. The key people are the production workers,

shipping and receiving clerks, inventory clerks, data entry and storeroom personnel who process the transactions regarding the issues and receipts to and from inventory.

As George Plossl has so aptly stated, accurate inventory records are the very foundations for successful MRP systems. We all know that the simple arithmetic logic of predicting shortages in the future begins with the present on-hand balance. If that number is wrong, all the precision in the world applied to the forecast and resulting master production schedule and the bill of materials will be for naught.

In order to meet these challenges, one must organize. Organize in the sense of the word by assigning responsibilities and holding people accountable for the record accuracy. Organize physically by creating a controlled-access stockroom that will make possible the centralization of responsibility for this vital function.

Volumes have been written about how to achieve inventory record accuracy and perhaps the best is an article by George Plossl in which he draws the simile between the operation of a bank accounting for your money and the operation of a storeroom accounting for the parts required for your manufacture. An over-simplification in many people's eyes, but a lot more truth than fiction.

The important element, I feel, is being certain that all those who are involved in the transactions understand the need for accuracy and discipline in accounting for each one to avoid missing transactions. Errors of omission are just as important as errors of commission. There's one exception to this that bears repeating; that is, errors in part number identification will result in two records being incorrect, rather than merely one. It is for this reason that any procedure that will reduce the number of times that a number must be written or translated or will serve to reduce the number of errors that creep into the system. I would say it should be an objective to eliminate the writing of part numbers at any point in the transaction process.

Perhaps one of the most traumatic changes is that of creating a stockroom with access limited only to those with legitimate business. In a firm that's operated with wall-to-wall inventory, this may be an extreme measure, and that it is. But it is one of the most important tools that will enable responsibility for inventory accuracy to be charged to the warehouse manager. The warehouse manager should be responsible to the inventory manager, so there is an unbroken chain of responsibility and accountability.

Other tools such as direct-access terminals, counting scales, marking devices, engineering drawings, where-used files, etc., should be made available in setting up a functional warehouse area.

Cycle counting is the method by which continuing measurement of inventory record accuracy is made. More importantly, cycle counting is the diagnostic tool to isolate errors and provide the entry for identification of the basic cause of the error, and correction.

Here's another area where education is important in order to thoroughly develop the understanding that cycle counting's main purpose is not to correct the status record but to identify sources of error which can lead to correction of the basic problem. A creative and imaginative analyst should be assigned full-time to tracking down the sources of all errors uncovered by the cycle counting or any parts shortages.

Another point to remember is that cycle counting is not merely an implementation activity, but is one that will be on-going for the life of the journey toward full MRP implementation. One will never finish finding errors that lead to inventory inaccuracies as to err is human. Therefore, one should consider reallocation of the annual investment in taking physical inventory to a distribution throughout the year on a 80/20 basis. That is count and re-count the significant few that account for most

value, on a frequent basis. Leave the insignificant many to an annual basis, depending on how the C-class items are reordered.

A significant point with regard to improving inventory accuracy is that it must be initiated early enough to assess the work that needs to be done, and it will not be too effective until the basic tools are provided to enable responsible people to be held accountable.

5. Bill of Materials Accuracy

The bill of materials is not the last step in the engineering design, but the first in manufacturing planning. It is vital that it reflect the manner in which the material moves on the shop floor. It must be re-structured where necessary, to define exactly the correct product structures.

Depending on the nature of your product, there may be potential for modularizing your bills. This would reduce the number of options requiring forecasting as well as reduce the size of bill of materials files. This is a subject requiring top management understanding because Engineering is often outside the area of responsibility of the P&IC or Manufacturing management. I feel responsibility for structuring bills of material should be a responsibility of P&IC.

A disruptive influence to bill accuracy is that of engineering changes. Since few product designs remain static, there will always be engineering changes in process that will require management of their effectivity. All too often, I've had piles of engineering drawings popped on my desk with the statement, "Here are all the drawings you need to implement the change." Still to be answered are questions such as, "Are the new parts interchangeable with the old?" "Will there need to be new part or model number designators?" "Which parts will require spares to be purchased?" "How long should spares be maintained?"

Initially, some of these questions may seem irrelevant. In the long run, they are important because they affect the size of the inventory master files, policies for ordering and manufacturing, as well as effectivity.

6. Item Analysis. Determination of the parameters for the individual parts requires some organization. The proper purchasing party should be assigned responsibility for the ordering parameters, such as lead times, order quantities, safety stock and family codes. It takes a real concerted effort to sit down and establish the numbers for each of the inventory items, but it is a necessary requirement.

The decision rules for establishing these are documented in the various educational course materials and will not be reviewed here. What is important is that there be understanding that the validity of the output of MRP, i.e., the planned orders, is dependent upon these parameters.

For newcomers to MRP, it is vital that all parties understand the proper application of safety stock. We found that the user was prone to add safety stock at all levels, rather than some at the top level and some at the bottom.

A tremendous assist to the early utilization of output is family coding wherein parts that should be ordered or run together are related by message, department or buyer code, or other sorting method. Frustration is eliminated if early attention can be paid to providing this assist to the user. We delayed in implementing this ourselves and found that many parts were missed in the early planning because of the difficulty of finding all of the like items while planning a work center.

I am reminded of an example of the importance of learning PIC nomenclature. At one company I visited, we had a session committed to establishing and reviewing these inventory parameters. After the session, he said, "I have just one question. What are

parameters?" This was a lesson to me to be certain that all terms are explained to everyone's satisfaction.

7. Master Schedule Preparation and Policy. My feeling is that most companies are still learning about how to effectively master schedule. Judging by the number of papers at this conference on the topic, there is a tremendous need. Master scheduling must be seen as a set of continuing activities, not just a single action. It begins with a forecast, the responsibility of Marketing, which in turn is modified into a production plan reflecting desired changes in inventory or backlog. It is necessary that it finally take the form of a game plan that is capable of being executed. Much has been said, and will be said, about checking the feasibility of the master schedule to confirm that it is within the rough-cut capacity of the plant.

Perhaps the most significant experience we have had is the simple change we made to our bills, wherein we added the labor for each part. Thus, we can develop a labor requirement at the same time we are generating a material requirements plan. This provides us with an effective first-cut capacity plan which highlights changes necessary to the master production schedule. A significantly better level of understanding is reached in developing the master schedule on a regular basis with the General Manager. Since ours is a marketing-oriented management, I feel it has been difficult for Marketing to accept the realities of the master production schedule. Our current experience with manual master scheduling of our major new product line has demonstrated the value of the master production schedule. I feel there is a new level of understanding of the fact that a factory is not a fairyland and that scrap is generated occasionally, and vendors do miss their deliveries because of a variety of problems that are beyond the control of manufacturing. When this occurs and is input to the master schedule, the impact can be seen and appreciated by all parties.

Similarly, when changes in the marketplace call for an increase or a decrease in the production rate, the impact of these can be demonstrated by use of the simulation that MRP provides. And last, but not least, the policy covering changes to the master schedule is vital for stable operation of MRP. The master schedule cannot be changed at will with the production rate going up and down like a yoyo. My feeling is that the master scheduling procedures provide the best demonstration of the new way of managing a company that derives from MRP. Certainly reductions in inventory are helpful and improvements in customer service nice to have, but the picture of the business that the master schedule and MRP provides is almost unparalled by any other management tool.

8. Systems Work & Software Selection. At this point in time, this task has been tremendously reduced by two factors. One is the emergence of fully tested and comprehensive MRP packages that include most, if not all, of the elements now felt to be vital to success. Second is a project by Ollie Wight and Darryl Landvater to write a definitive description of an MRP software package and to compare the existing software offerings against this standard. In my opinion, these manufacturing software "consumer reports" are worth every penny of their cost. For the first time, the inexperienced practitioner can determine what is available in the software, and compare packages against the ideal standard, feature by feature.

As related previously, our own experience was that we wasted much time and effort trying to make do with a package that simply was not an MRP package. Even after the change to outside service, we were not aware of some omissions in that package until we learned the hard way.

If there is any question of your ability to make these choices, a qualified consultant can be called upon to help you identify your needs and to evaluate software and the ability

to do your job. As has been said many times, MRP is not a computer challenge but rather a people problem. This should be thoroughly understood by all who tend to make it otherwise.

The rapid emergence of computer services indicates that this will be the way of the future for many small firms who otherwise do not want to become involved in in-house computer installation. Offsetting this, however, are the tremendous strides being made by micro and mini-computers.

Experience with several firms indicates that many management people feel uncomfortable with data processing by services. Problems of security, reliability and cost loom large in their minds, and many times do not get fair comparison with in-house costs. It seems one thing to receive an invoice from a service bureau, fully detailed and proportional to the volume. It is another picture to quantify the in-house costs when they are disbursed among equipment rentals, supplies, space, salaries, supervision, etc. Our experience was that we could get started with an out-house service having working software within two or three months at comparable cost to doing it in-house, without having to wait for the nine months to a year we felt it would have taken to modify the software and implement with our own personnel. The opportunity cost of that delay was one of the largest factors influencing us to utilize an out-house computer service. It also afforded the opportunity to compare some of the contemporary features such as direct data entry and terminal inquiry with the traditional batch mode of the in-house shop having a small computer.

Our people are learning to feel comfortable conversing with a computer while making inquiries. Hopefully, we will reach the point in the near future where full credibility will be had in the electronic files, which will lead to the elimination of hard copy files which are now existing. We plan to increase the number of terminals and points of direct input to make the system more accessible, especially to the purchasing and warehouse people.

Much could be said about the merits of in-house vs. out-house, but that is a matter for individual decision, depending on the scale of your operation, the capabilities of the people, and the management commitment to owning vs. renting the machinery needed to perform this vital information processing.

9. Pre-Installation Tasks. The first of these is an organizational question. Decisions should be made assigning planning responsibility, either by products or functions. Which works best for you is probably a function of the capabilities of your planners as well as the diversity of your products and variety of processes required. At present, we are experimenting with having manufacturing planning by geographical plant, and purchasing planning by product.

The physical cleanup is important to accomplish prior to the final pilot program because any half-finished jobs will add needless complications to the challenging times that go with initial cutover. Here is the time to identify and enter each of your open orders, clarify that the required components are there, and make efforts to finish them off. If possible, issue the remaining parts and put them with the half-finished items in order to minimize exceptions during the initial piloting.

10. Pilot Program. Here is the opportunity to verify that the system is generating correct information. This is the time when credibility will be established and where the people can develop confidence in the ability of the output to match the real world. It's vital at this stage to monitor the impressions that users are developing. This will be necessary in order to identify areas where errors exist and get someone to determine the causes and correct them prior to users developing the attitude that the system just won't work.

Here's where a decision must be made about removing the "crutch" of the previous system. There will be mixed feelings about this, but my experience indicates that it is more effective in the long run to have everyone input all of their energies toward making the system work. If you permit retention of the predecessor system, it is likely to be used informally. There is obviously risk, but nothing ventured, nothing gained. One caution, of course, would be to satisfy yourself that there are no serious errors or gaps in the information.

But this is the purpose of the pilot program. It is here that one sees that the numbers conform to reality or that there is some error someplace. As the plan indicates, it is vital to monitor late orders, the validity of due dates, and watch the production rate vs. master schedule. I might add that it is necessary to resist comparing the MRP output with previous order point figures because of the inconsistency of the two approaches. It is far more relevant to compare the MRP with the real needs out on the manufacturing floor or in the warehouse, than to make meaningless comparisons.

11. Cut-Over. Proof of the pudding and the effectiveness of your planning will be quickly demonstrated when the move is made from the pilot program to implementation on all product lines. Many will attempt to cut over too soon and hopelessly bog themselves down in trying to manage the problems for all products. Best counsel is to be satisfied that you have covered all bases in the pilot product line prior to adding additional ones. The disciplines, the understanding, the education, the bills of material accuracy, the master scheduling, should be common to the remaining product lines or divisions. Confidence should be built by achieving positive results rather than risk dilution by doing too much too soon.

Users who have become capable in their utilization of MRP should be utilized to help implement and de-bug the remaining product lines as they are added. It is important that each product receive intense coverage, looking for any errors early in the game, rather than allow them to surface later at a critical time when it is more difficult to correct them.

My impression is that MRP is a never-ending series of events and this is confirmed by the experience of several of the plants that have been cited as some of the most successful MRP implementations. There are always challenges of new products, new people, new developments in hardware, and new levels of understanding. Each of these will require continuing education on the part of users and management to ensure that one doesn't relax the disciplines and procedures after the initial flush of getting started. Several papers presented at past conferences have pointed out that one is never finished on the journey to MRP and an effective planning and control system. Shop floor control and capacity requirements planning are the natural following steps to be pursued after the initial installation of MRP. For many firms, these are presenting some of the same challenges as the initial efforts at MRP posed.

The minimum threshold size for a company to justify the effort of MRP keeps declining annually with the decline in the cost of computers, coupled with the increase in the power of computers and effectiveness of software. At this point in time, if you are contemplating MRP, or if you have made initial ventures and do not feel entirely satisfied with your efforts, MRP can be better the second time around! But why not do it right the first time?

BIOGRAPHICAL SKETCH
DONALD REICHERT

Currently Manager of Manufacturing for Up-Right Scaffolds Division of Up-Right, Inc., Don has 25 years of experience in manufacturing engineering, systems, and management. He received his BSME and MBA degrees from the University of California, Berkeley.

He teaches P & IC and Operations Management at UCB Extension, and does some consulting. A registered ME and IE, he is a certified Manufacturing Engineer and a Fellow of APICS. Don is President of the Golden Gate Chapter of APICS and spoke at their recent seminar.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
1. First cut education	Top Management P & IC	-1	What is MRP and how does it work. Why should we as a company commit to it.
2. Justification, commitment, and assignment of responsibility	Top Management P & IC	0	Formal commitment
A. Prepare justification	P & IC	0	Cost vs. benefit
B. Commit to the project	Top Management	0	
C. Set up implementation team and team leader	Top Management	0	Team leader is full time
D. Schedule periodic management project reviews	Top Management	0	Approximately every month to include all those responsible for parts of the project currently active.
3. Detailed educational plan	Team leader	0- +8	This phase of the plan is aimed at the people part of the system. To allow them to to understand the system and be able to use it effectively. The program must translate the general principles of MRP into the specifics of operation at the company.
A. Outside courses for people who will be teachers at the in-house courses but have not been to an outside course as part of the first cut education (#1 above).		+1	
B. Purchase MRP video course	Team leader	+1	This course will serve as the framework for all future educational courses.
C. Teachers video course	Team leader	+1½	Teachers and team leader go through the video course to translate the general principles into specifics.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
D. Top management course	Team leader	+3	Unit 1, Unit 3, Unit 4, Unit 5. Pres., all VP's, Plant superintendent if one exists, any others as appropriate.
E. Production and inventory control, Purchasing	Team leader Purch. Mgr. P & IC Mgr.	+4	All units in the video course. All people in P & IC and purchasing.
F. Shop foremen	VP Mfg. or Plant Spdt.	+4	Unit 1, parts of Units 3, 4, 5. All shop foremen.
G. Stockroom people	Inv. Mgr.	+3	Unit 1, parts of Units 3, 4, 5. Anyone who will be making transactions to and from stock.
H. Sales and marketing	Team leader	+5	Unit 1, parts of Units 3, 4, 5. All sales and marketing people.
I. Engineering	Team leader or Engr. Mgr.	+4	Unit 1, parts of Unit 2 that deal with bills of materials, parts of Units 3, 4, 5. Anyone who will be working with bills of materials or routings.
J. Data processing	Team leader or DP Mgr.	+5	Unit 1, Unit 2, parts of Units 3, 4, 5. Systems people and programmers that will be working with MRP programs or files.
K. Lead men and set up men	Shop Foremen	+7	Unit 1
L. Anyone affected by the system and not included in the courses above		+8	As required

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
4. Inventory accuracy	Inventory Manager	+8	This phase of the plan is aimed at bringing the inventory accuracy to 95% of the parts within the counting error. This must be accomplished before the pilot program can proceed.
A. Measure 100 parts as a starting point	Inventory Manager	+1	This will help assess the work that needs to be done to bring the inventory records to 95%. It also serves as the first measurement point in the control group.
B. Map out limited access to the stockroom areas	Inv. Mgr. Team Leader	+1	Lay out any stockroom changes that are necessary to insure limited access.
C. Provide the tools for limited access and transaction recording.	Top Management Inv. Mgr. Team Leader	+2	A fence, enough stockroom people, adequate space, counting scales, labels, skids, etc.
D. Assign responsiblity for the the inventory accuracy	Top Management	+3	The inventory manager and his people are now responsible for the inventory accuracy. Change job descriptions where necessary.
E. Start cycle counting on the control group of 100 parts	Inventory Manager	+3	Control group parts are counted once every ten days. Any inventory errors are investigated to find the cause of the error.
G. Each ten days a report is published showing the results of the control group	Inventory Manager	Ongoing	The report should show the running totals for inventory accuracy each ten days and the causes of the errors.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
H. Bring the accuracy to 95% of the parts within counting error	Inventory Manager	+8	As measured by the control group.
5. Bill of material accuracy	Engineering P & IC	+8	This phase of the plan is aimed at eliminating errors from the bills of material. There is no percentage figure here to compare against. The tasks in this phase must be completed before the pilot program can begin.
A. Measure 100 bills of material as a starting point	Engineering	+1	This will help assess the work that needs to be done to eliminate the errors from the bills of material.
B. Decide and assign responsibility for the accuracy of bills of material	Top Management Engineering P & IC	+1	This may involve centralizing some responsibilities and setting up procedures to control the flow of documents.
C. Verify the bills of material for correct part numbers and quantities per assembly	Engineering Team Leader	+8	This requires a line by line audit of the existing bills of material to verify that they represent the correct components and in the correct quantities.
D. Verify the bills of material to show the correct structure of the product	Engineering P & IC Team Leader	+8	This requires restructuring where necessary to show: the way material moves on the shop floor, modular and/or phantom levels.
E. Decide on and implement bill of material policies	Top Management Engineering P & IC Team Leader	+5	Policies: 1. Engineering change procedure 2. Documenting special or new products

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
6. Item analysis	P & IC	+8	This phase of the plan is where the ordering parameters for all the parts are verified or in the case where they do not already exist they are created.
A. Measure 100 parts as a starting point	P & IC Team Leader Purch.	+1	The parts are checked for correct lead times, order quantities, safety stock (if applicable), family coding.
B. Agree upon and assign responsiblity for the ordering parameters	P & IC Team Leader Purch.	+1	Depending on how purchasing fits into the organization there could be some division of responsibility here.
C. Verify and/or establish ordering policies	P & IC Purch.	+8	Decide among fixed, lot for lot, and period order quantity. Part period balancing should not be used.
D. Verify and/or establish order quantities and order modifiers	P & IC Purch.	+8	Order quantities on fixed order policy parts. Modifiers are not required on all parts.
E. Verify and/or establish lead times	P & IC Purch.	+8	Manufactured parts-use normal scheduling rules. Purchased parts-use current lead times
F. Establish safety stock levels	P & IC	+8	Independent demand parts-consistent with customer service objectives. Dependent demand parts-in special circumstances.
G. Establish family codes	P & IC Purch.	+8	Parts that should be ordered or run together.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
7. Master schedule preparation	P & IC	+8	This phase of the plan does the work required to set up a working and accurate master schedule. It does not run the master schedule. That is done only when the system is in operation.
A. Provide the means to break the production plan into the master schedule	P & IC	+5	The production plan in terms of dollars, hours, units, etc. must be broken down into a statement of specific part number and time periods.
B. Provide the means to total the master schedule and convert back to the units in the production plan	P & IC	+5	This is a check to insure that the master schedule truly reflects the company's game plan and that it is within the rough cut capacity of the plant.
C. Develop a master schedule policy	Top Management Marketing P & IC Team Leader	+7	This policy should cover the procedure for making changes to the master schedule. The requests for changes can come from marketing, management, or P & IC. It should also cover the mechanics of a monthly review comparing both sales and shipments to plan. This may be cause for changing the plan.
E. Develop and load the first master schedule	Top Management Marketing P & IC Team Leader	+8	This is the first master schedule to be used in the system. It should also include any service part usage.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
8. Systems work and software selection	Data Processing	+8	This phase of the plan addresses the work that needs to be done in the area of selecting software, systems and programming, and conversions from the present systems to MRP.
A. Review and select software to be used	Data Processing Team Leader	+2	The software should be evaluated for bill processing, MRP logic, inventory transaction processing, open order transaction processing, shop floor control, and capacity planning.
B. Systems work and programming on inventory transaction processing	Data Processing	+3	Issues, receipts, cycle counting.
C. Systems work and programming on bill of material processing.	Data Processing	+3	Normal bill of material functions.
D. Systems work and programming on open order processing	Data Processing	+5	Open manufacturing orders, purchase and distribution orders.
E. Systems work on MRP logic	Data Processing	+7	Any modifications that need to be made.
F. Agree on time schedules and cutoff times	Data Processing Engineering Inventory P & IC Team Leader	+3	Frequency of jobs, reports, and the cutoff times for inputs to the system.
9. Pre-installation tasks	P & IC Team Leader	+8	This phase of the plan is aimed at the tasks that immediately precede the pilot program.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
A. Set up planner structure and part responsibilities	P & IC Team Leader	+8	Vertical vs. horizontal structures. Which planners are responsible for which groups of parts.
B. Set up the procedures for handling bottom up closed loop planning, and top down closed loop planning	P & IC Shop Foremen Purchasing	+8	Specific procedures for rescheduling, order release, and delivery problems. These procedures should address both purchasing and the manufacturing floor.
C. Make any changes in the way shop orders are being issued to the floor	P & IC Shop Foremen	+8	Issue orders with all the components to the floor.
D. Physical clean up	P & IC Shop Foremen	+8	Physical clean up on the shop floor to insure that each open order has all the required components, and that all parts on the floor are part of an open order.
E. Final training	Team Leader	+8	This is any last minute training in the use of specific forms, documents, and imput timing.
10. Pilot program	Everyone involved so far	+8- ++9	This is the pilot program. It is a trial run of the system on one or a group of product lines that total several hundred part numbers. The purpose is to verify that the system is giving correct information.
A. Monitor the critical measurements	Team Leader	+8- +9	Monitor late orders, validity of due dates, production vs. the master schedule.

MRP DETAILED IMPLEMENTATION PLAN

TASK	RESPONSIBLE	DATE	COMMENTS
11. Cut over	Everyone involved so far	+9- +12	This phase of the plan is concerned with the sequence that is used to move from the the pilot program to implementation on all product lines.
A. Group the remaining product lines into three or four divisions	P & IC	+9	Divisions should contain product lines that are similar or share common parts.
B. Bring each division onto MRP, one division at a time	P & IC	+9- +12	As each division is put onto MRP set up planner coverage so the product lines involved get intense planner coverage until they are quieted down.
12. Shop floor control	P & IC Shop Foremen Team Leader	+13	Now planning out beyond the first year. Details will be filled in at +7 or +8.
13. Capacity requirements planning	P & IC Shop Foremen Team Leader	+14	Details to be filled in at +7 or +8.

MATHER & PLOSSL, INC.

Management Counseling and Education

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MATHER & PLOSSL, INC. provides specialized counseling and education to assist companies in improving asset management and also gives advice and guidance to help clients develop their own capabilities in designing, installing and using effective control systems. We have no "staff consultants"; we personally train and guide your people by means of educational courses and periodic counseling visits. Our years of experience with International companies in all types of industries is unmatched.

Our educational efforts are aimed at improving the professional capabilities of people at all organization levels having an impact on inventory management and production control systems. We offer a wide variety of scheduled courses bringing together individuals from different companies and also conduct in-plant sessions for company groups.

Our Top Management courses are designed for all high level executives who direct or work closely with materials planning and control activities. It covers what managers of Marketing, Finance, Sales, Engineering and Manufacturing want to know about effective control of manufacturing operations; the level of detail and perspective are developed for top management people. This course emphasizes what can be done in both the short and long term to improve return on investment by better management of inventories and production.

Our Lower and Middle Management long courses provide attendees with experience using a complete system on a real computer. After studying theory, strengths and weaknesses of proven techniques, investigating how they work in a complete system and discussing ways to apply them to different businesses, attendees are given problems to solve — vendor delays, engineering changes, equipment breakdowns, record errors, even a president's edict — the kind of problems manufacturing people encounter every day. CRT terminals in the classroom provide access to the computer system to get data needed to solve the problems. This experience provides valuable insights into the interaction of priority and capacity, how techniques really work int he context of a system, practical ways to solve problems and the proper roles of people and systems. Shorter classes cover specific techniques or topics of current interest, such as material requirements planning, structuring bills of material, master production scheduling, etc. In-plant courses are custom-tailored to meet the client company's objectives.

We also assist companies in developing their own educational programs, helping them develop the curriculum and providing texts, films and other visual aids, worksheets, case problems and reference materials.

Write or call us for course schedules, fees or other information.